



Memorandum

U.S. Department of
Transportation
Office of the Secretary
of Transportation
Office of Inspector General

Subject: **ACTION:** Management Advisory on Weaknesses
in the Safety Oversight of Explosives
Classification Approvals
Pipeline and Hazardous Materials Safety
Administration

Date: April 7, 2010

From: Ann Calvaresi Barr
Deputy Inspector General

Reply to
Attn. of: J-2

To: Pipeline and Hazardous Materials Safety Administrator

At the request of the House Subcommittee on Railroads, Pipelines, and Hazardous Materials, we were asked to follow up on concerns they had identified with how the Pipeline and Hazardous Materials Safety Administration (PHMSA) processes explosive classification approvals. We are providing this advisory to inform you of weaknesses we have identified with this process so that you can take corrective action.

Our work shows that immediate attention is needed to improve PHMSA's safety oversight. In summary, we identified two overarching concerns: (1) the lack of an effective evaluation process for reviewing and authorizing explosive classification approvals according to the Hazardous Materials Regulations¹ and (2) ineffective oversight of the four labs authorized by PHMSA to examine and test explosives.²

THE PROCESS FOR REVIEWING AND AUTHORIZING EXPLOSIVE CLASSIFICATION APPROVALS HAS SHORTCOMINGS

We identified three shortcomings in the explosive classification approvals process that call into question whether explosive approvals are based on correct classifications or appropriately authorized. First, PHMSA lacks uniform, formalized guidance for classifying and approving explosives. As such, within PHMSA, there is not a clear consensus on the definition of a new explosive, which can lead to inconsistent

¹ 49 CFR § 173.51a (2010).

² PHMSA has authorized four testing labs (examining agencies) that provide independent third-party analysis in recommending a hazard class. The four agencies include: (1) Explosives Bureau, (2) Safety Consulting Engineers, Inc., (PHMSA has since revoked this lab's authorization), (3) Safety Management Services Inc., and (4) Energetic Materials Research and Testing Center, New Mexico Technology.

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interpretation and incorrect classification procedures. Second, PHMSA did not adhere to regulatory requirements for reclassifying an explosive—an issue that also led to a complaint to the OIG Hotline. Finally, PHMSA did not properly resolve this complaint because it lacks formal processes and controls to address internally contested safety decisions and conflicts of interest during investigations.

PHMSA Lacks Uniform, Formalized Guidance for Classifying and Approving Explosives

PHMSA has not provided its personnel with formalized guidance for classifying and approving explosives.³ As a result, they primarily interpret the Hazardous Materials Regulations on their own, which has led to varying definitions of what constitutes a “new explosive” and how the regulations apply. In 1998, PHMSA’s (then the Research and Special Programs Administration) Director, Office of Hazardous Materials Technology, contracted with consultants to develop a guidance manual to (1) clarify regulations on classifying new explosives substances and articles, (2) document PHMSA and testing lab employees’ explosive classification knowledge, and (3) provide a reference/training document for PHMSA and testing lab employees. More than 11 years later, this guidance has not been finalized, although nearly \$97,000 was expended to do so. Instead, PHMSA has relied on a draft version of the guidance published in 2002 because new management felt the Hazardous Materials Regulations were sufficient.

While the regulations clearly state criteria that must be met before a new explosive can be transported (shown at right), they are less clear on what constitutes a “new explosive” and when testing is required. Specifically, the regulations define a new explosive as produced by a person who has either never produced that explosive or is now producing it with changes to the formulation, design or process that could alter its properties; however, the regulations do not specify what would constitute such a change.⁴ The 2002 draft guidance manual does address this issue, stating that “An explosive substance developed, produced, and classed by a specific manufacturer and relocated or co-located to a different manufacturing plant or facility

- ✓ Explosive must be tested by 1 of 4 PHMSA-approved labs.
- ✓ The testing lab must provide a test report recommending a hazard class/division, according to the agreed upon international ranking system (see attachment 1).
- ✓ The person or company requesting the explosive classification must apply to PHMSA for the explosive approval and include the test report and/or other supporting documentation.
- ✓ If the request meets these criteria, PHMSA's Associate Administrator for HAZMAT Safety approves it in writing, and the product receives an explosives approval number.

³ In discussion over this advisory, PHMSA stated it has published Standard Operating Procedures (SOP) for the Evaluation and Issuance of Explosive Classification Approvals. However, unlike the draft guidance manual, the SOP is strictly internal. The draft guidance manual was intended to assist manufacturers, shippers (clients), and examining laboratories in ensuring that uniform explosive hazard classification procedures, data gathering techniques, and reporting methods are employed.

⁴ 49 C.F.R. § 173.56 (2010)

should be examined and reclassified.” However, without updated, formal guidance that is followed and enforced within all PHMSA offices, inconsistent classification and noncompliant authorizations can occur.

For example, one approval we reviewed involved a company that wanted to use an existing explosives approval to manufacture the same product at another location without having the relocated product retested.⁵ A specialist in PHMSA’s Office of Special Permits and Approvals (SPA) believed that the company would have to retest the product because the manufacturing process at the new location could be different and may alter the product’s explosive properties. A chemist in PHMSA’s Office of Hazardous Materials Technology (HMT) concurred. However, according to this chemist, the lead supervisory chemist within HMT stated the explosive had been previously approved and that the company’s request should be granted. Had it not been for our review, PHMSA would have approved the company’s request without having the product retested or examining the company’s safety record.⁶ This is a significant concern since this company has a 6-year history of poor explosives safety compliance. Most recently in September 2009, the company was cited for six probable violations, including transporting explosives under a special permit with other unauthorized explosive products on the same vehicle. PHMSA has since instructed the company to follow the Hazardous Materials Regulations and obtain a test report on this explosive.

Currently, engineers at all four PHMSA-authorized testing labs state that they use PHMSA’s draft guidance manual when testing explosive products submitted for classification. However, PHMSA could not confirm whether each authorized testing lab is consistently implementing the guidance. To address this issue, PHMSA should update and formalize the 2002 draft guidance—ensuring that it specifies steps for classifying explosives and clarifies the Hazardous Materials Regulations where needed—and require all PHMSA offices and authorized testing labs to comply. PHMSA management has stated they plan to formalize the guidance.

⁵ The process for this specific approval was first brought to the attention of the House Subcommittee on Railroads, Pipelines, and Hazardous Materials by a PHMSA employee. The committee then asked us to follow up to determine whether the request had been approved and whether doing so was in compliance with the Hazardous Materials Regulations.

⁶ The Hazardous Materials Regulations [49 C.F.R. § 107.113f (5) (2010)] provide PHMSA with the authority to do examine applicant fitness and compliance histories.

PHMSA Did Not Adhere to Regulatory Requirements for Reclassifying an Explosive

PHMSA failed to ensure Hazardous Material Regulations were followed when it approved a company's request to reclassify an explosive device to a non-explosive class.⁷ Both HMT and SPA offices approved the reclassification without the required authorized testing lab report and despite conflicting chemist conclusions.⁸

When an explosive classification or reclassification is requested, HMT is responsible for performing the technical review of the explosive. A chemist is assigned to review the application, including all diagrams and test reports from a PHMSA-authorized testing lab. The chemist recommends the shipping method, hazard class/division, and compatibility group. A supervisory chemist then reviews the documentation and agrees or disagrees with the chemist's recommendation. If the supervisor agrees, HMT forwards the request to SPA, which ensures special permits and approvals are properly supported and documented before submitting them for authorization by the Associate Administrator for Hazardous Materials Safety.

However, in this case, before the company formally requested that its product (a fire suppression device) be reclassified as a non-explosive, the company's president first met with a chemist and the supervisory chemist in HMT to discuss potential shipping classification options. The company then submitted a formal application for reclassification in August 2007, which would allow the product to be shipped in the same quantity under less stringent packaging requirements on both passenger and cargo aircraft. The company included data and video on its own product tests and subsequent written justification in January 2008—but never submitted any external test reports from PHMSA-authorized testing labs as required by regulations. The HMT chemist disapproved the reclassification request because the company's video showed that the effects of an explosion were not completely confined within the device as required by regulations for non-explosive classifications, which could also impact the safety of packaging and shipping.⁹

Despite the chemist's disapproval and the company's failure to meet regulatory requirements, the HMT supervisory chemist overturned the chemist's recommendation and forwarded the reclassification request to SPA. SPA did not question the lack of a test report from a PHMSA-authorized lab and authorized the reclassification and shipping method by air—without coordinating the approval with

⁷ PHMSA approved reclassification of the explosive device from explosive class 1.4S (articles, pyrotechnic) to a 4.1 flammable solid class (non-explosive).

⁸ Under 49 C.F.R. 173.56(i), PHMSA could reclassify an explosive based on "experience and other data," but this authority was not invoked when the reclassification was granted.

⁹ According to the Hazardous Materials Regulations, a substance is not in the explosive class if the effects of the explosion are completely confined within the article. This is consistent with UN Recommendations on the Transport of Dangerous Goods Model Regulation 15th Revised Edition, which states that explosive articles—except devices containing explosives substances—in such a quantity or of such a character that their inadvertent or accidental ignition or initiation during transport shall not cause any effect external to the device either by projection, fire, smoke, heat or loud noise.

FAA.¹⁰ As a result, the chemist who initially disapproved the reclassification filed a complaint with the OIG Hotline, indicating his supervisor “wrongfully” changed the classification of the device against his strong recommendation that it remain in the explosive materials class. The complaint was reviewed by our Complaint Center Operations staff who, after initial review, found no systemic fraud, waste, abuse, or criminal activity and forwarded the complaint to PHMSA for resolution. In October 2009, the chemist brought his concerns with the resolution of the complaint to our attention, and we included it as part of this review.

PHMSA Lacks a Formal Process and Controls for Appropriately Resolving Internally Contested Safety Decisions

PHMSA lacks a formal process for resolving internally contested safety decisions. Had such a process been in place, the complaint to the OIG Hotline referenced above may have been avoided. However, PHMSA’s internal review of the complaint was not conducted independently, and its results were not supportable.

First, PHMSA assigned the Director of HMT (the complainant’s manager) and the Director of SPA (the person who concurred with the reclassification) to investigate the complaint. There were no internal controls to prevent a conflict of interest during the investigation or ensure the complainant remained anonymous as requested. Management knew the complainant’s identity because there are only three chemists in HMT, and generally only one chemist reviews explosives approvals. Therefore, those individuals should have recused themselves, and an impartial investigation should have been conducted by other PHMSA staff to avoid a conflict of interest. In response to our findings, PHMSA has since stated that it will assign staff not involved in the complaint for future internal investigations.

Second, PHMSA’s response to our Complaint Center (April 14, 2008) contained unsupported statements. PHMSA’s memorandum indicated that the company submitted a test report from New Mexico Tech (a PHMSA-authorized testing lab), which tested and evaluated the fire suppressant device. PHMSA stated that New Mexico Tech recommended that the device be reclassified as a non-explosive (i.e., flammable solid, 4.1). We found, however, that the test report did not exist, and a New Mexico Tech official confirmed that testing for this product was not performed at their facility. While PHMSA’s investigative memorandum stated it had thoroughly reviewed all information and followed all established procedures, this obviously was not the case since PHMSA did not detect that the required test report did not exist.

Officials from the company who requested the reclassification also informed us that they did not submit an examination report to PHMSA for the device from New Mexico Tech. Rather, they had submitted a copy of another company’s examination report for a different product tested by New Mexico Tech. The company officials

¹⁰ Although not required, we have previously recommended better coordination with the appropriate Operating Administration, and this is an example of why coordination is so important for safety reasons.

said they believed that product was similar to their fire suppressant device, which New Mexico Tech had classified as a 4.1 non-explosive. However, any similarity in the product does not change the fact that a test report from a PHMSA-authorized testing lab on the actual product is required by law. In addition, after examining the test report for the “similar” product that had been reclassified, we found it was not even similar to the product involved in the OIG Hotline Complaint.¹¹ PHMSA did not acknowledge these issues in its internal review, which further underscores the need for impartial investigations and a revised approach for conducting them.

Because we questioned how this complaint was resolved, PHMSA has agreed to have the devices tested at its own expense (nearly \$19,000) by an authorized testing lab. However, we do not believe Federal dollars should be used; the company should pay for the tests because it failed to obtain them as required when submitting the original reclassification request. An even larger concern is that, in the interim, the company is still allowed to ship the device by air as a non-explosive. In light of the potential safety issues, PHMSA should reinstate the device to its original classification of explosive until the testing lab’s results are published and provide our office with a supportable decision on the reclassified explosive. As part of its response to our 2009 testimony on PHMSA’s safety oversight of special permits and approvals PHMSA planned, by February 2, 2010, to establish a PHMSA Safety Review Board to resolve internally contested safety decisions.¹² Two months later, on April 5, 2010, PHMSA issued an order establishing the Board.

PHMSA LACKS EFFECTIVE SAFETY OVERSIGHT OF AUTHORIZED TESTING LABS

Over the last 10 years, PHMSA has not conducted fitness inspections or safety reviews at any of its four approved explosives testing labs.¹³ As a result, there is little assurance that the labs are operating under safe conditions or meeting the terms and restrictions of their approval to test explosives. These terms and restrictions help ensure public safety, inform PHMSA of each lab’s workload, and avoid conflicts of interest between the testing labs and their clients. Among other things, they require that:

¹¹ The tested product was only the main propellant substance, and not the entire device itself (i.e., the main propellant substance, confined in a steel case with an electrical igniter and a booster propellant to get it burning hot).

¹² OIG Testimony Number CC-2009-096, “PHMSA’s Process for Granting Special Permits and Approvals for Transporting Hazardous Materials Raises Safety Concerns,” September 10, 2009. OIG reports and testimonies are available on our website: www.oig.dot.gov.

¹³ To become a PHMSA-authorized testing agency, any organization or person seeking designation must apply in writing to the Associate Administrator for Hazardous Materials Safety. The application must include, among other things, documentation that supports the applicant’s qualifications, knowledge, and ability to conduct explosives examination and testing. Upon receiving PHMSA’s approval, the testing agency must abide by a series of conditions, such as not manufacturing or marketing explosives.

- Facilities where explosives testing is conducted must have a valid Federal Bureau of Alcohol, Tobacco, Firearms, and Explosives license at time of testing.
- No single revenue source [companies submitting products for testing] may provide more than 20 percent of the lab's gross income during the reporting period.
- Testing labs must have at least 10 years of experience in the examination, testing, and evaluation of explosives and must not be involved in manufacturing or marketing explosives.

In addition, to maintain their approval to operate, the labs must report annually to PHMSA on (1) how many explosives they tested and approved, (2) what companies requested testing, and (3) whether the lab complied with the above criteria. If PHMSA determines—either through safety reviews or the annual reports—that a testing lab is not meeting its approval conditions, PHMSA has the authority to modify, suspend, or terminate any explosives approvals issued to companies.

However, we found that PHMSA did not question labs that either violated their approval criteria or failed to submit the required annual reports. Specifically:

- Two testing labs are subcontracting their responsibilities to examine and test explosives to two companies that are not PHMSA-authorized testing labs, both of which manufacture high explosives. This presents a conflict of interest that would prohibit those companies from directly obtaining a PHMSA approval to operate as a testing lab under the Hazardous Materials Regulations.
- One testing lab has not submitted to PHMSA its annual activity report or certificate of compliance for any of the last 5 years. When we requested the required reports, test lab personnel told us that they were not aware of the requirements and did not have a copy of the approval because it had been misplaced. Although the approval conditions had not been met, PHMSA never took action to correct these deficiencies. PHMSA is currently working with the testing lab to collect the required information.
- For three testing labs, PHMSA could not provide us with either their annual report of activity or certificate of compliance or confirm whether the reports had actually been submitted. PHMSA is currently working with the testing labs to collect the missing information. (See attachment 2 for details on the annual reports submitted from 2004 through 2008.)

PHMSA's lack of oversight of its testing labs' operations puts the integrity of the explosives classification program at risk. In its response to our recent report, PHMSA stated its action plan would include new application and review processes for testing

labs and require expiration dates and renewal processes for their approvals.¹⁴ In discussion over this advisory, PHMSA stated it established a team to inspect testing labs; the team has inspected three of the four labs over the last month, and its reviews thus far indicate the need for enhanced oversight. For example, the team found that one lab had been sold and was under new ownership; yet, the new ownership never filed for a new approval. This was the same lab that had failed to submit annual activity reports for 5 years. Therefore, PHMSA revoked the lab's authorization to examine and test explosives.

PHMSA states it has developed a number of actions to address the issues presented in this advisory, such as a Safety Review Board to resolve internally contested safety decisions and new guidelines for oversight of authorized testing labs. We have yet to verify whether these actions have been fully implemented and will continue to monitor PHMSA's progress as it begins implementing procedures in these areas.

CONCLUSION

Our previous work identified safety concerns that call into question the effectiveness of PHMSA's process for granting special permits and approvals to transport hazardous materials. While PHMSA has actions underway to address our concerns, we have continually found emerging problems with PHMSA's Special Permits and Approvals Program. Therefore, PHMSA must ensure that these weaknesses are not indicative of more systemic issues. A baseline assessment is needed to reconfigure operations and procedures to ensure that PHMSA has an effective process to evaluate explosive classification approvals and oversee authorized testing labs. While PHMSA has generally responded positively to our findings raised with this program, to effectively strengthen the program and achieve its mission of safety, PHMSA must take a more proactive approach overall to resolving safety issues.

If you have any questions concerning this management advisory, please contact me at (202) 366-1427 or Lou E. Dixon, Assistant Inspector General for Aviation and Special Program Audits, at (202) 366-0500.

Attachments (2)

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cc: Deputy Secretary
 Chief of Staff
 Chief Safety Officer, PHMSA
 John Hess, PHA-30
 Martin Gertel, M-1

¹⁴ OIG Report Number AV-2010-045, "New Approaches Needed in Managing PHMSA's Special Permits and Approvals Program," March 4, 2010.

CLASSIFICATION OF HAZARDOUS MATERIALS

There is an internationally recognized system for classing, identifying and ranking all types of hazardous materials created by the United Nations (UN) Committee of Experts on the Transport of Dangerous Goods.

Under the UN classification system, all explosive substances or articles are divided into nine general classes according to physical, chemical and toxicological properties:

Class 1: Explosives

Class 2: Compressed and Liquefied Gases

Class 3: Flammable Liquids

Class 4: Flammable Solids

Class 5: Oxidizers and Organic Peroxides

Class 6: Toxic and Infectious Materials

Class 7: Radioactive Materials

Class 8: Corrosive Materials

Class 9: Miscellaneous Hazardous Materials

According to the UN Model Regulations and 49 CFR, Class 1 explosives are divided into the following six divisions:

Division 1.1 consists of explosives that have a mass explosion hazard. A “mass explosion” is one that involves almost the entire load instantaneously.

Division 1.2 consists of explosives that have a projection or fragmentation hazard, but not a mass explosion hazard.

Division 1.3 consists of explosives that have a mass fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

Division 1.4 consists of explosives that present a minor explosion or pyrotechnic hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected.

Division 1.5 consists of very insensitive explosive substances that have a mass explosion hazard, but are so insensitive that there is very little probability of initiation, or of transition from burning to detonation, under normal conditions of transport.

Division 1.6 consists of extremely insensitive articles that do not have a mass explosion hazard. This division is comprised of articles which contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

Table. Testing Lab Data Showing Need for Improved PHMSA Oversight of How Approval Conditions Are Administered

PHMSA Authorized Testing Lab	Annual Report of Activity Provided?	Annual Certification of Compliance Provided?
Safety Consulting Engineering		
2004	No	No
2005	No	No
2006	No	No
2007	No	No
2008	No	No
Energetic Materials Research and Testing Center		
2004	Yes	Yes
2005	Yes	Yes
2006	Yes	Yes
2007	No	No
2008	Yes	No
Safety Management Services		
2004	Yes	Yes
2005	Yes	Yes
2006	No	No
2007	Yes	Yes
2008	Yes	Yes
Explosives Bureau		
2004	Yes	Yes
2005	Yes	Yes
2006	Yes	Yes
2007	Yes	Yes
2008	No	No